

### **Small Wireless Communications Facilities**

Deployment Realities

September 2015









## So you want to deploy a small cell or DAS... what do you do?



### Small Cells in the Outdoor Environment

**Location**: Dallas, Texas





### Small Cells in the Outdoor Environment

### Location:

Atlanta, Georgia Wynnewood, Pennsylvania



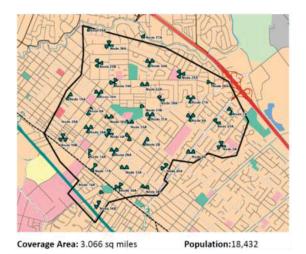


## Modeling an oDAS Solution for a Community

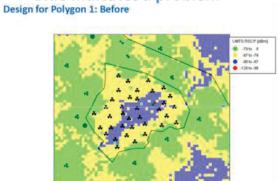
**Location**: Palo Alto, California

A minimum of 3 to 5 Macro Sites would be required for similar coverage that an oDAS deployment provides to gain similar reliable customer coverage and capacity

Initial Design for a Community which needs additional coverage and capacity

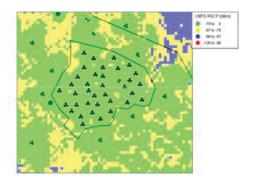


#### Blue indicates a problem



The goal is to get to GREEN

Design for Polygon 1: After

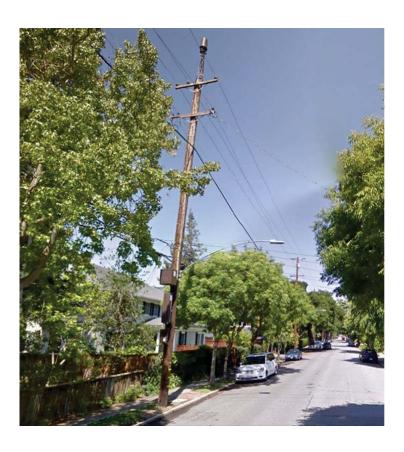




#### **Historic District**

#### Location:

Along Waverly Street, Professorville Palo Alto, California



- "(4) In areas considered by the board as having a unified design character or historical character, the design is compatible with such character. This finding can be made in the affirmative in that the one pole located within the Professorville Historic District (12xx Waverly), with the conditions of approval, is consistent with the Secretary of Interior's Standard for Rehabilitation." [1]
- "(6) The design is compatible with approved improvements both on and off the site. This finding can be made in the affirmative in that the project, as conditioned, is compatible with existing utility poles. [2]



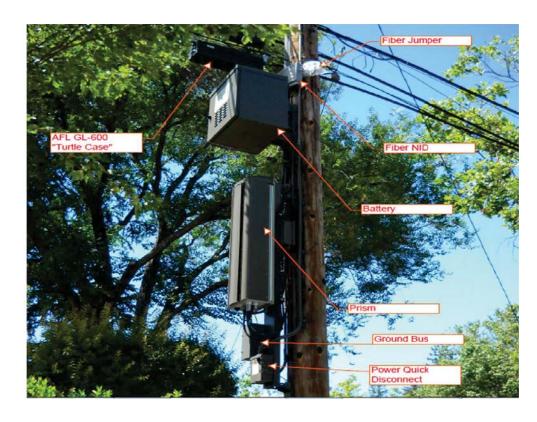
<sup>11 &</sup>quot;Findings For Approval Architectural Review Board Standards for Review, AT&T DAS-Phase I/File No. 11PLN-00340," Attachment A (2011)

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### **Historic District**

#### Location:

Along Waverly Street, Professorville Palo Alto, California



#### **Power System**

- 1. Power Switch
  - √ 10"Hx5.5"Wx5"L
- 2. Battery Cabinet
  - √ 27"Hx22"Wx18"L
- 3. Fiber Demark
  - ✓ 13"Hx13"Wx14"L

#### **Radio Amplifiers**

- 4. Slim to fit profile
  - √52.4"Hx12"Wx10"L
  - √Slim to fit profile
  - ✓ Modular upgrades, capacity & neutral hosting
  - √8 Frequency Bands per cabinet

#### Antenna

- 5"x5"x8ft fiberglass extension
- 6. Mounting brackets
- 7. Radom Antennas
  - ✓ 24"Hx16"D



### oDAS in the Windy City

**Location**: Chicago-Grant Park





### oDAS

**Location**: 90210 City, Beverly Hills, California





### **oDAS**

#### **Location**: SoBe, Miami Beach, Florida

- Crown Castle Solutions and AT&T have a 2014 Agreement to build a 30-Node Outdoor DAS in and around the City of Miami Beach.
- 26 of 30 Nodes are designated "historic".
- Approvals required:
  - Local Historic Preservation Board , then
  - State Historic Preservation Board.
- 6 nodes are now approved by the Local Historic which allows a filing with the State Historic Preservation Board.
- The State Historic Preservation Board approval is said to take a minimum of 60-90 days for approval.

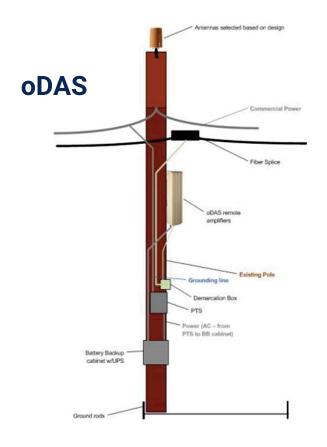


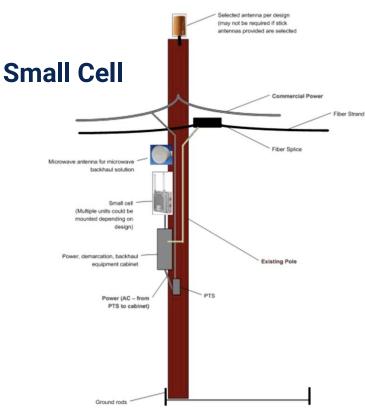
1900 Convention Center Drive, Miami Beach Today





### **Side by Side Comparison Small Cell and oDAS**



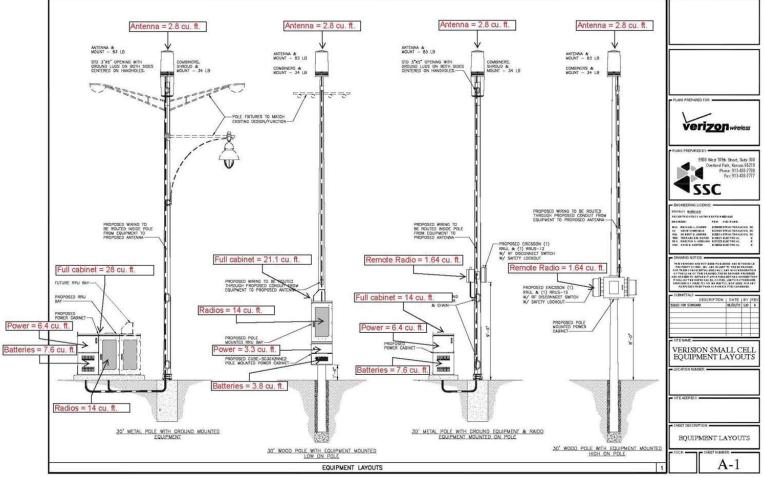




### More Deployment Examples



### **Small Cell Pole Options**





**Region**: MW-Michigan/Indiana/KY

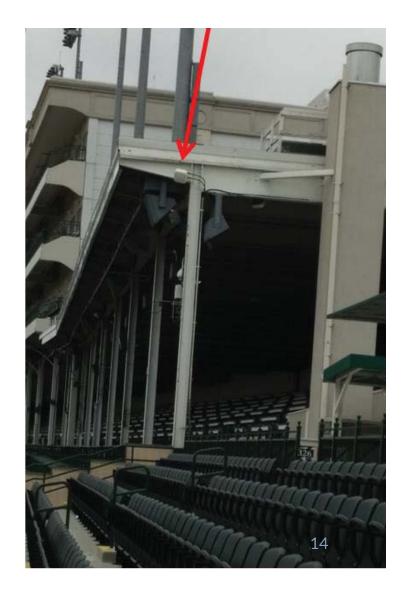
**Completion Status**: Completed

Project Description: DAS on top of a 60' pole.

**Historic Property Details**: Site located on listed HP; listed HD .38mi away; listed HP .34 mi away; listed HP .12 away

**Approval Status**: No adverse effect. Consulting party requested additional information regarding site with no further action required.





Region: NE-NY Metro

**Completion Status**: Completed

**Project Description**: The proposed equipment is over both limits (6 x 6 x about 1.5 - 2), but is relatively hidden. The antennas look to qualify for under 3CF

**Historic Property Details** : On contributing building to eligible Main Street Historic District

**Approval Status**: SHPO Concurred, local party conditional concurrence if conditions of installation are met and equipment not visible





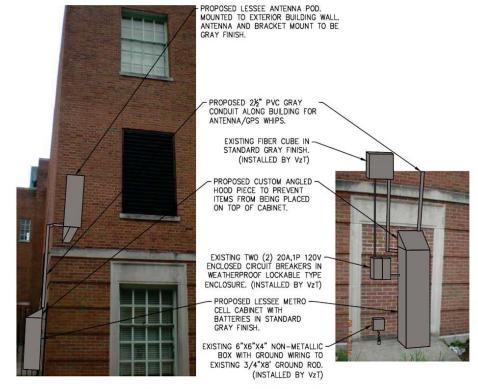
Region: NE- Philadelphia

**Completion Status : Completed** 

**Project Description**: Equipment is approximately 13 cubic feet (22407 cubic inches). Antenna is installed 11'4" off of the side of the building. Antenna is approximately 2' in height

**Historic Property Details**: Site is located in an eligible HD. 1.49 miles away from eligible HP (school); .16 away from eligible HP (hotel)

Approval Status: No adverse effect







Region: NE-Upstate NY

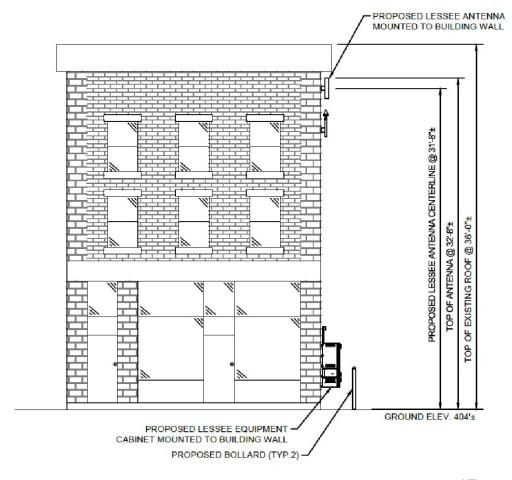
**Completion Status**: Completed

**Project Description**: Small cell and equipment on non-prominent façade between buildings, antenna painted to match

**Historic Property Details**: Subject building is a eligible historic property, additional eligible historic property in the visual APE

Approval Status : No Adverse Effect



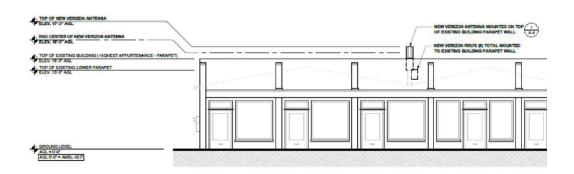


Region: WE-Northern California/Nevada

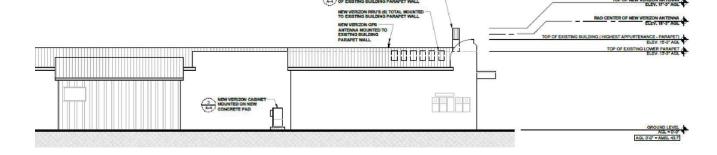
**Completion Status**: Completed

**Project Description**: One antenna on the roof of a c.1940s building, Equipment on side of building, but visible location. Antenna under 3CF, Equipment around or under 17CF

**Historic Property Details**: No Historic Properties









Region: MW-Indiana Kentucky

**Completion Status:** 

Completed

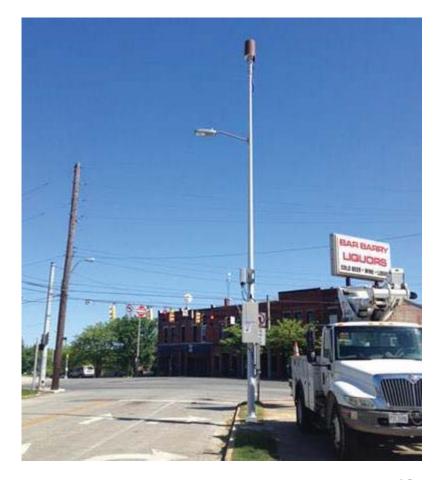
**Project Description**: Collocation on street light in an active ROW requiring Section 106 due to historic district. One antenna, two radios, and one cabinet all falling within volumetric requirements for small cells. This is one of three small cells on street lights in the same ROW, each within 0.4 miles of each other. The other two fell outside the historic district and did not require a Section 106.

**Historic Property Details**: Two Historic Properties visible from limited vantage points.

Approval Status : No Adverse

Effect





### **Deployments** on Poles

**Project Description**: New Small Cells in Detroit





## Utility Pole Deployments with Dimensions





### **Utility Pole Deployments** with Dimensions

Location:

Princeton, New Jersey

**Antenna** 

Dimensions: 24" tall by 16" diameter;

Total Volume: 2.8 cubic feet

**Shroud** 

Dimensions: 47.3"tall, 21.5"wide,

13.7"deep; Total Volume: 8.1 cubic feet





## Typical Utility Pole Installations



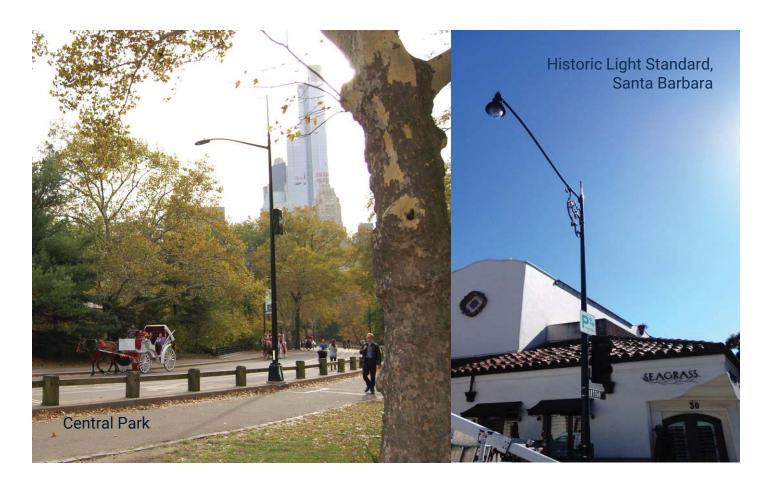


### **Typical Light Pole Installations**





### Historic Light Pole Installations





### Freestanding Pole with No Aerial Fiber





### Banner Pole Installations with Dimensions

Antenna:

8.13 ft3

**Shrouds for electronics:** 

10.6 ft3

**Total volume:** 

18.73 ft3





### Multi-Carrier Pole





### **Deployments in Historic Districts**

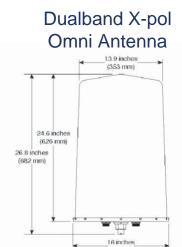




### **Deployments in Historic Districts**

Location:

Franklin Village, Michigan









## Deployments on Non-Pole Structures

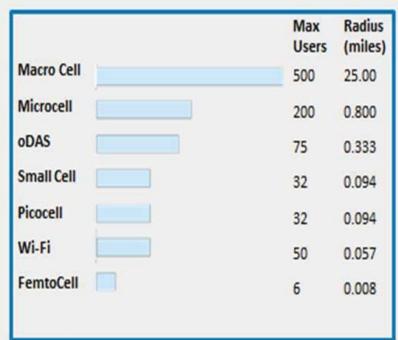




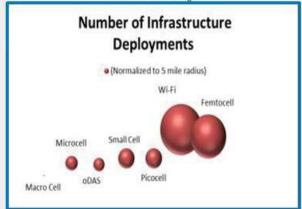
### DAS and Small Cells Coverage



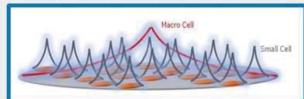
### **Wireless Coverage and Capacity Solutions Comparisons**



For Coverage (Not Capacity) Potential Nodes or Access Points for a 5 Mile Radius Design



Technologies (UMTS, HSPA+, LTE) Are Not Equal Across All Solutions







### SUBURBAN MORPHOLOGY

- · Primarily residential
- Tunnel RF down streets
- 60ft trees
- Avoid horizontal clutter



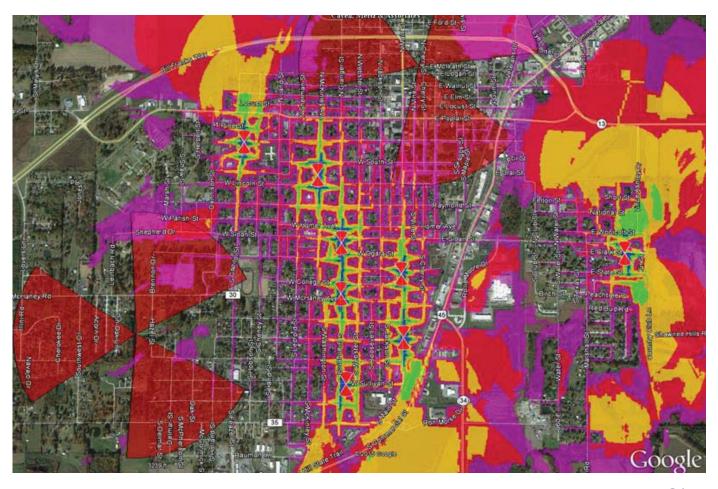


### CASE STUDY -HARRISBURG CLUSTER





## COVERAGE DESIGN ATOLL RSRP





# COVERAGE DESIGN DRIVE TEST RSRP





#### CONCLUSION

- Small wireless communications facilities allow for increased coverage, capacity, and overall broadband penetration
- A streamlined wireless communications facilities siting process with additional Section 106 Review exclusions is necessary to incentivize and expedite broadband deployment to reach our nation's growing broadband demand

